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Improving Higher Education Through Increased Efficiency

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Abstract

The concept of efficiency is developed as it applies to higher education. As to whether or not there is overinvestment in higher education, the evidence presented indicates a recovery in the social rate of return since the mid-'70s, and high returns since 1946 relative to total returns to housing or to financial (bond) assets.

Efficiencies are explored as they relate to the internationally somewhat unique U.S. emphasis on university-based user-driven research, use of part time RAs and TAs, college placement offices, and financing shared with families able to pay. Inefficiencies are also explores, such as sources of considerable excess capacity, high-cost low-output curricula, and rare use of cost/effectiveness analysis in budgeting.

The overall international competitiveness of U.S. higher education is considered, together with means of improving its efficiency, thereby providing the resources and the enhanced external support for increasing quality and access.

Fmproving Higher Education Through Increased Efficiency

Walter W. McMahon

Increased efficiency is one means of sustaining and improving quality and access. Increasing either quality or diversity at given levels of efficiency requires additional resources. So especially in the anticipated periods of budget stringency, there is need to focus on the third element in the uneasy triangle of quality, diversity, and efficiency. Should total resources for higher education grow significantly in real terms, it nevertheless continues to be in the best interest of universities and colleges to use resources efficiently to the best possible advantage, and thereby maintain their competitiveness.

Approximately 32 billion dollars in additional Federal budget cuts will be required in each coming year to meet the Gramm-Rudman Federal budget deficit reduction targets. This situation as has been stressed by Terry Hartle (1988) and Arthur Hauptman (1988) will result in continuing pressure to limit increases in Federal support of higher education, R&D, and Federal support for state-operated programs such as Medicaid, which in turn reduces the capacity of states to respond to the needs of higher education. There is a broad concern with the slowdown in productivity growth in the United States, and some awareness of the relevance of investment in education at all levels as well as in R&D in order to reverse these trends. But even though there is likely to be less conflict between the Bush Administration and the Congress on education issues than there was during the preceding

Administration, the reluctance to introduce changes in taxes suggests that the budget facts are likely to remain grim. But beyond this, Congress and state legislators want efficiency in the use of their tax dollars, just as parents want efficiency in the use of their tuition dollars. So seeking to improve quality as well as access by improving efficiency will continue to be a viable strategy. Delivering better quality and at the same time maintaining or improving access or diversity for the given amounts of resources that are available helps colleges and universities to avoid waste and related sources of criticism and, through improved competitiveness positions them well to obtain additional support.

Efficiency is a difficult concept however for many in higher education. It is often because it is misinterpreted to be limited to only internal budget reallocation. The latter inevitably makes someone "worse off," which leads to opposition and to disputes about what constitutes quality. The result is that efficiency decisions are either delegated to Vice Chancellors of Academic Affairs, or efficiency is merely ignored, or both.

Arthur Hauptman (1988) defines efficiency as the financial efficiency with which a particular Federal student aid or research reimbursement program is administered within its own pre-determined goals. Although this is one aspect of efficiency, concept of efficiency in economics is considerably broader than that, in ways that will be addressed in this paper. One can share his concern that the Federal student Pell grant programs are tending to be less targeted on the truly needy, although in the broader context of efficiency this would

be thought of instead as a reduction in vertical equity. Arthur Hauptman's concern with excessive indirect cost charges by universities for research is an inefficiency in the system, especially if its source is a monopoly rent charged by some universities under the label of (padded) cost-based reimbursement for performance of the overhead functions. Finally, the faster tuition increases by higher education institutions in those periods when state financial support is particularly tight are regarded by Hauptman as perverse and inefficient. The problem with this is that it ignores the devastating effects on the internal inefficiency of universities of off-again on-again financing. This efficiency loss must be weighed against the effects of irregular rates of increase over time in tuition rates used by colleges and universities as a means of stabilizing their revenues.

In what follows, this paper will consider efficiency in higher education more broadly, including

1. The Concept of Efficiency, or the internal and external efficiency of institutions as well as efficient investment strategies,
2. The Efficiency of U.S. Higher Education, an evaluation of the trends in the social rates of return and some indicators of the relative efficiency of U.S. higher education compared to that in other countries, and
3. Remaining Potential Sources for Improvement in Efficiency.

I. The Concept

Efficiency often is ignored because it either is not understood very well, or because it is defined too narrowly to mean only internal budget reallocations accompanied by cuts.

But the broader concepts of Pareto efficiency and of efficiency in a dynamic context need not involve budget cuts, or leaving anyone "worse off." Specifically "Pareto moves" in a college or university budgeting environment involve finding those changes that increase efficiency, and thereby make some students or some programs "better off" without making anyone "worse off." Such moves therefore obviously require unanimous consent, a very tough standard. Although unanimous consent is sometimes possible in budget committees and program decisions, it is too demanding to be possible to achieve in all situations. The alternative is to arrange by various means to compensate those who are adversely affected. Since this compensation principle results in no one being left "worse off," it reduces to the Pareto criterion. The Pareto criterion can be viewed as kind of a minimal ethical principle, but from an efficiency perspective it is also a means (hopefully at minimum cost) of reducing conflict, and of facilitating change that otherwise could not occur.

Means of providing for compensation that are less costly and therefore frequently used include allowing the budget cuts that may be necessary as part of reallocations to be handled through attrition. A second important means is by personnel reassignment, seen as a frequent (and often quite successful) practice when academic administrators or some tenured faculty change roles. A third means is the

common use of a "grandfather clause," as when current students are not hit with new curriculum requirements but are instead expected only to meet the requirements printed in the catalogue as of the date they entered the program. Sometimes outright financial compensation is paid, as in the case of early retirements.

Finally, and most important, in a dynamic context over time, an efficiency-increasing investment strategy merely increases those budget lines more rapidly where the efficiency gain is the greatest, and increases all other budget lines more slowly. The economic criteria that is needed to implement this efficient investment strategy involves making some estimate of the expected benefits in relation to the costs, or where possible, the social rate of return to the investment (which is a benefit/cost ratio). It is far less important and sometimes quite impossible to make a precise numerical estimate of the benefits and costs than it is to approach each budget decision with some qualitative judgment of the prospective effectiveness or benefits in relation to the cost of the investment if an efficient investment strategy is to be achieved.

Expenditures on higher education are in fact an investment in human capital formation. They yield returns later in the form of higher earnings throughout the life cycle, and also higher productivity of the individuals involved to the extent that earnings reflect the individual's true productivity. The appropriate measure of the efficiency gain or benefit/cost criterion, under these conditions is the social rate of return. It includes all of the cost to the society of the investment, including the tuition and foregone earnings

(roughly room and board) costs to the family as well as the social costs to the taxpayers and donors who support the institution. The social rate of return is that pure internal rate of return that discounts the stream of earnings before taxes expected over the life cycle of each graduate back to its present value and sets it equal to the total private and social costs.

An efficient investment strategy therefore is not a one time event decided upon by a special budget committee or a task force. It is a continuing process of annual and more frequent iterations, increasing investment by larger percentage amounts where the social rate of return is highest and increasing it more slowly or not at all where the potential efficiency gain is negligible.

II. The Efficiency of U.S. Higher Education

Whether or not the U.S. is overinvesting or underinvesting in higher education as a whole depends primarily on the level and the trend of the social rate of return to higher education in relation to the investment alternatives. After considering this, an evaluation of the efficiency of some of the major features of U.S. higher education will be offered in comparison to the structure of comparable institutions elsewhere in the world.

Is the U.S. Overinvesting in Higher Education?

The evidence is that the real social rate of return to investment in higher education in the U.S. has remained at a relatively high and steady approximately 11 percent rate of return since 1939. There was a dip in the 1973-79 period as the large wave of baby boomers were

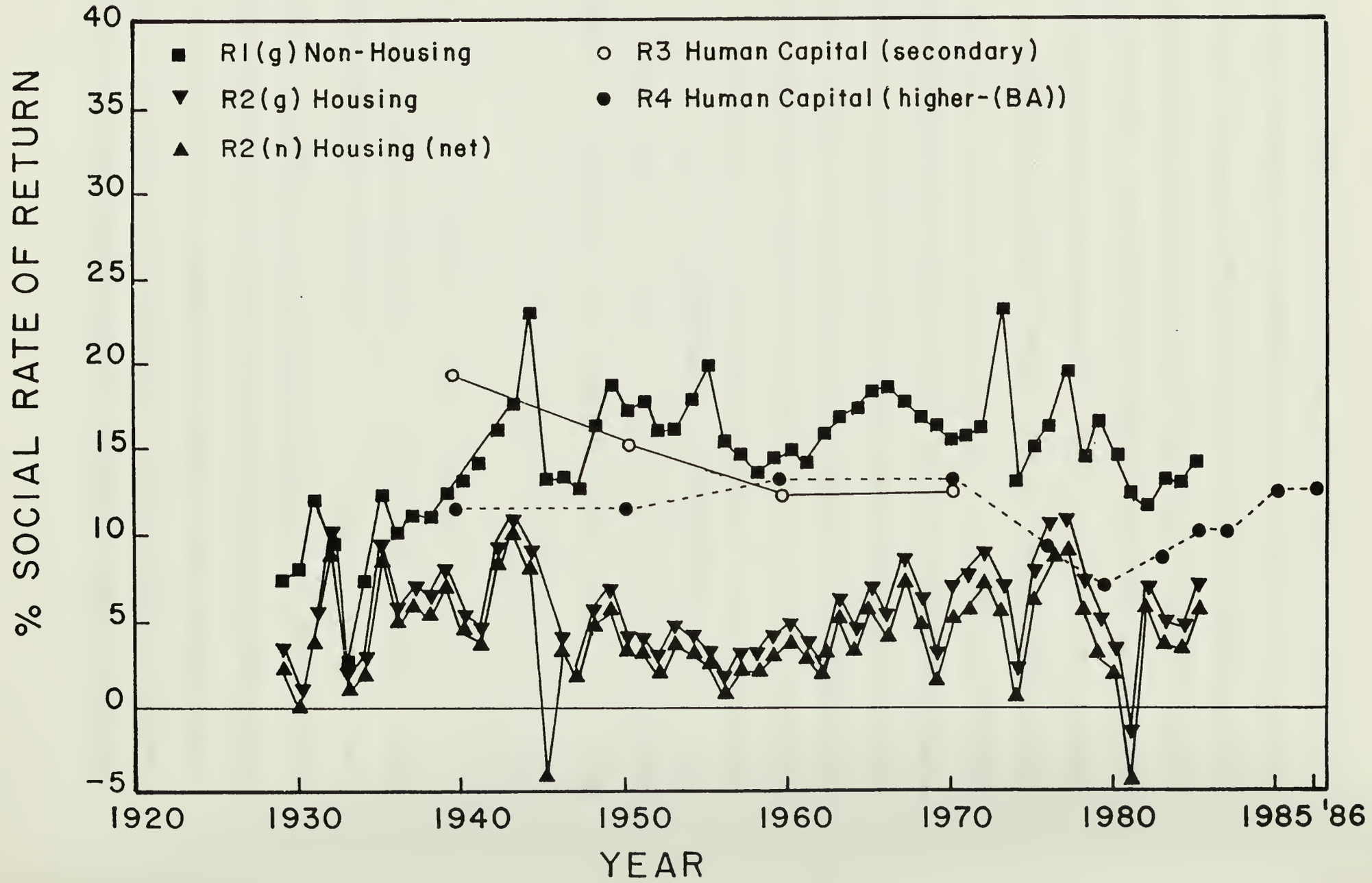
assimilated into the labor market, as was noted in McMahon and Geske (1982, p. 161), by Finis Welch, and others. But this was temporary, and the relatively stable 11 percent real rates of return held up in spite of the huge influx of college-educated veterans entering the labor force in 1950-55 as the result of the GI Bill, the dramatic expansion of community colleges in the 1960s, and the expansion of Federal student grant and loan programs following the Education Amendments of 1972.

The reason that the social rates of return have not fallen, and that diminishing returns to higher education has not set in, is that the demand for college graduates simultaneously increased. It is also a necessary element that the internal efficiency of the higher education system cannot have declined substantially, or these rates of return over cost could hardly have remained stable. But the demand for graduates continues to grow in part because it is known that as technical change occurs, educated workers hold a comparative advantage in the workplace in implementing the new technology (see Bartel and Lichtenberg, 1985).

Relative to the alternative uses of investment funds, this approximately 11 percent rate of return to investment in human capital is shown in Figure 1 in relation to recent carefully done calculations by Ed Mills (1988) of the real rate of return to investment in housing capital, and to investment in non-housing fixed capital. The returns to human capital come out about in the middle. They are somewhat below the 15 percent or so real returns to non-housing capital, and significantly above the average 5 percent returns to housing capital,

Figure 1

Real Returns to Human, Physical, and Housing Capital



Sources: R 1, R 2: Edwin Mills (1988)
R 3: Psacharopoulos and Woodhall (1985,p.59)

both of which are calculated to include capital gains. By this measure there is underinvestment in non-housing physical capital, and significant overinvestment in housing in the U.S., but the rate of investment in higher education (being in the middle) is about right.

We will return to this last point in a moment, but the temporary decline in the returns to higher education in the period between 1973 and 1981 deserves closer attention. Richard Freeman (1976) noted this decline in his book The Overeducated Americans, but did not develop its temporary nature. The U.S. fertility rates peaked in 1957 at 3.77 children per family, leading to a large cohort of college graduates entering the labor market and depressing the mean earnings of college graduates in the 25-34 age group relative to the earnings of high school graduates from the 1.27-1.33 range in 1967-72 to a trough of 1.15 in 1974 as seen in Table 1. This same wave of baby boomers bid up housing prices and capital gains on housing as noted by Ed Mills (see Figure 1). But then the relative earnings of college graduates recovered to their previous level of 1.32 by 1981, and has even risen above that since then to 1.46 and 1.51 by 1985 and 1986. In terms of rates of return, Elchanan Cohn and Woodrow Hughes (1988) controlling for the extent to which college graduates differ in significant respects from non-college graduates find that the real rate of return declined to a low of 6 percent in 1978, but then started to recover by 1982 (e.g., Cohn, 1988). For purposes of rate of return calculations, the earnings in the older 35-44 age ranges are also relevant. As can be seen in Table 1 these also showed a dip, but only a temporary one in 1980-82. This ratio of college to high school earnings

Table 1

Ratio of Mean Income of College to High School Graduates

All Males	Year								
Ages	1967	1968	1969	1970	1971	1972	1973	1974	1975
25-34	1.33	1.32	1.33	1.33	1.27	1.22	1.19	1.15	1.19
35-44	1.53	1.47	1.58	1.54	1.55	1.55	1.52	1.55	1.56

All Males	Year								
Ages	1976	1977	1978	1979	1980	1981	1982	1983	1984
25-34	1.26	1.21	1.24	1.22	1.27	1.32	1.40	1.41	1.35
35-44	1.55	1.48	1.47	1.52	1.48	1.42	1.42	1.48	1.47

All Males	Year		
Ages	1985	1986	1987
25-34	1.46	1.51	N.A.
35-44	1.54	1.57	1.54*

Source: Current Population Reports, Series P-60, Money Income of Families and Persons in the U.S., U.S. Bureau of the Census, June 1988 (for 1986 data) and earlier issues.

*The 1987 figure is for median income from CPR, Series P-60, No. 181, "Advance Data from the March 1988 Survey." For comparability of 1987 to 1986, the median in 1986 (1.57) is the same as the mean (1.57) for the 35-44 age group.

in the 35-44 age range recovered to its long time average of 1.54 by 1985, and appears to be holding steady in the 1.54 to 1.57 range in 1986 and 1987. This comparative advantage in the earnings available to college graduates relative to high school graduates in the somewhat older age ranges is an important factor stabilizing the social rates of return to higher education.

Returning to the level of the real returns to various types of investment, the overinvestment in housing may be due to the large tax advantages especially to owner-occupied housing and the easier access to housing credit than to credit to finance investment in human capital or in non-housing fixed capital and financial assets. The real returns on non-equity financial assets that carry somewhat less risk is also lower. The 1989 long term AA corporate bond rate is 10 percent, for example, and the prime rate is 9.1 percent. When corrected for the current inflation rate of 4.9 percent, these result in real rates of return of 5.1 percent and 4.2 percent respectively (see Data Resources Incorporated, 1988, p. 1), which are considerably below the returns to investment in human capital. Furthermore, these returns to investment in human capital are far more stable than the returns to investment in financial assets (see McMahon and Geske, 1982, p. 161). The greater volatility of returns to housing capital has been noted by Ed Mills (1988) and can be seen in Figure 1.

What evidence there is therefore with respect to the level, trend, and relative stability of the returns to higher education does not suggest that there is overinvestment. Instead there may be modest

underinvestment in human capital (and in non-housing fixed capital) relative to the rate of investment in housing and in bonds.

Implications for the U.S. Saving Rate

The saving rate as conventionally measured is low in the U.S. by international standards, and there is great concern to learn how it can be increased. A new light is shed on this however when it is recognized that total saving, using the standard definition of saving as refraining from consumption, includes the amounts provided by parents as they restrict their consumption to pay college tuition, room, and board for their children. Total investment, similarly, includes these savings being invested in human capital formation.

The interesting point is that as public subsidies financed through taxation (which restrict consumption) encourage families to invest more in education than they might otherwise, the parents are encouraged to restrict their consumption even more to finance the total educational investment being made. Total savings and total investment is thereby increased. It is unlikely that as much would have been saved by the parents if the child had left home and gone to work after high school. The emotional attachment of the parent to the child, the concern for his or her future, and the public (tax and expenditure) encouragement to this instinct is a powerful force encouraging saving and investment toward the future.

The question is certain to be raised, since it has been of late, about whether especially Federal, but also state grant, loan, and subsidy programs are effective in inducing increased enrollments (and

hence saving and investment in human capital by families). The questions have usually been raised however by studies that do not control adequately for other effects on enrollment. When such controls are enforced, the effects of these programs are much more apparent.

For example, there was a 13 percent decline in the number of high school graduates nationwide between 1979 and 1984. The anticipated decline in college and university enrollments however did not occur. According to C. Frances (1984, p. 3), "enrollments grew between 1979 and 1984 by about 6%."

This is not surprising when one examines the highly significant positive effects on the amounts families decide to invest as the result of public Federal, state, and local subsidies after controlling for other effects. In the simultaneous equation results reported in Table 2, based on a sample of 5,200 individual students and their families, and after controlling for these other effects, these grant and subsidy programs are highly significant. That is, Table 2 controls for the reduction in the number of high school graduates by reporting the results not in aggre-gate terms but on a per family, or per capita basis. The effect of ability, A, on the investment to be made is taken into account, although it is not significant. The effect of the mother's education (S_M) and father's education (S_F) is controlled for, as is sex and race (by sorting the sample), as well as other things including the parents' income (as reported by the parent with his or her signature that it could be checked by access to IRS forms). The result was that Pell grant and tuition subsidies, S, turn out to be very highly significant ($t = 6.42$ to 20.35), as are publicly

Table 2

DETERMINANTS OF INVESTMENT IN EDUCATION BY FAMILIES
(Three-stage least squares; t-statistics in parentheses)

A. Males (Whites only)

Demand: $I_t = -62r^* + .04A + 2.66S_M + .97S_F - 2.36\mu - 1.06N_1 - 2.55N_2$
(14.92) (.48) (3.49) (1.26) (1.36) (1.31) (2.21)
$+ .90N_3 - 3.45N_4 - 1.60N_5 - 4.13N_6 + 3.74N_7 + .30$
(.82) (2.07) (1.74) (3.97) (4.57) (11.65)

Supply: $I_t = -4.44r + .43Y + .004S + .62L - .25B - .73W - .13O + .27$
(6.27) (21.82) (6.42) (23.18) (4.62) (45.41) (10.97) (22.33)

B. Females (Whites only)

Demand: $I_t = -19r^* + .19A + .47S_M + .29S_F - 1.19\mu - .18N_1 + 1.24N_2$
(6.71) (4.42) (1.21) (.74) (1.52) (.42) (2.07)
$- .57N_3 - .89N_4 + .51N_5 - 1.12N_6 + .97N_7 + .11$
(1.02) (.83) (.74) (2.62) (2.30) (6.15)

Supply: $I_t = -2.01r + .25Y + .005S + .37L - .16B - .62W + 1.93O + 7.54$
(5.57) (21.79) (20.35) (20.08) (5.71) (31.47) (2.79) (10.79)

Investment demand,

$$I = I(r^*, A, S_M, S_F, \mu, N_1, \ldots, N_6),$$

the supply-of-funds schedule

$$I = r(r, Y, S, L, B, W, O),$$

I = planned investment in college. The number of years of education planned by the student and his family (e.g., two-year associate degree, bachelor's, master's, M.D., Ph.D., etc.) was multiplied by the expected costs per year. The latter were the sum of tuition and fees, reduced by the tax subsidies and endowment fund subsidies to tuition, scholarships, and foregone earnings costs.

r^* = the expected rate of return. A pure internal rate of return to the planned degree program computed for each student by iterative methods. It equates the student's expected earnings over his or her life cycle (analyzed in McMahon and Wagner, 1981) to the family's total private investment costs as defined above by I. This is a *private* expected rate of return of the type relevant to private household investment decisions, which is developed further in McMahon and Wagner (1982) and McMahon (forthcoming).

A = ability, as measured by the ACT composite test score used for college admissions. Greater ability could be expected to increase the expected rate of return and hence shift the demand function upward as among different families.

S_M = schooling of the mother. The hypothesis is that home investments in children, when the mother has more education, raises the IQ or ability of the child (see Liebowitz, 1974) and also, especially if the mother has been to college, shifts the utility function toward greater farsightedness. Both imply larger investment in education.

S_F = schooling of the father, analogous to S_M.

μ = degree of uncertainty. This was measured by asking the student to estimate his or her degree of uncertainty about future earnings on a scale from 0 to 1.

N_6 = expected nonmonetary returns from education — the contributing of education to greater efficiency in household production of satisfactions (defined in more detail when relevant below).

r = the rate of interest on student loans. In the rare instance t the family borrows in the nonsubsidized, nonguaranteed l market to support human capital formation, r is the ma rate of interest available to them

Y = family disposable income, including earnings of the stud collected from parents and students separately in the surv

S = tax subsidies and endowment fund subsidies to tuition, f scholarship aid received from all sources.

L = student loans — the amount available to middle- or low income families, based on a means test, guaranteed by federal government, and available at a subsidized rate.

B = the number of brothers and sisters at home or in school. T is a limiting factor on the availability of family financial supp

W = work time spent in the market by the student, withdr from hours of study or leisure.

O = order of birth — a dummy variable, equal to 1 if the stud is the first-born. The hypothesis is that the first-born mal some families (especially black families) is expected to h support the family, so that foregone earnings are less avail for the support of further education.

supported student loans, L (t = 20.08 to 23.18). These key determinants of why families save and invest are the same for black females, but somewhat different for black males (McMahon 1976, p. 322). For grants (S), t = 6.04 for black females and t = 5.69 for black males, whereas for loans, t = 10.71 for black females and t = 10.65 for black males in terms of the effect of these policies on the decision to save and investment. This sug-gests that in spite of the decline in the number of high school graduates from 1979 to 1984, and in spite of the 1980-82 recession and its effects on parental income, Federal as well as state student financial aids were a stabilizing factor for investment by both blacks and whites.

A reasonable conclusion to reach, based on this evidence which controls for other effects, is that Federal (and state) support is effective in inducing higher rates of saving and investment in higher education by families.

International Comparisons of Efficiency in Higher Education

This evidence of efficiency indicated by a satisfactory rate of return and by the effectiveness of public policy in encouraging total saving and total investment is put in broader perspective by considering the relative competitiveness of the U.S. higher education system in relation to others.

Research at Institutions of Higher Education. Some institutions have major research functions, whereas others have almost entirely undergraduate teaching functions. Most current research at all of these types of universities, however, is separately funded by the

Federal government or by donors on a project-by-project, user-driven, peer-group-review basis. There are exceptions, of course, and some relatively small state and private university sources of funds are provided to help younger faculty get started and to keep teaching faculty in departments where there is little outside support (e.g., humanities) up to date. But apart from this, research time is financed by faculty who buy their time away from teaching, reimbursing their departments for time not spent teaching by separately funded outside-user driven objective-focused research grants.

The characteristics of this system in the United States, in contrast to the way it operates in many other countries, is that the research is largely user-driver, based on peer-group review in the attempt to insure its scientific merit, and integrated with graduate instruction. The procedures connected with each of these three basic characteristics are not perfect. But consider the alternatives.

Basic research in many other countries is concentrated in separate research institutes, rather than in the universities. These institutes are manned by salaried staff, engaged in research that is not supported by the users of the output. The output often therefore sits on the shelf, and the research enterprise is less externally efficient.

Integration of the research with graduate instruction also is somewhat unique. By these means, the new technology gets transferred much more quickly as part-time graduate research assistants finish their programs and enter industry or other employments. In contrast, full-time, aging professional research assistants who are not graduate degree candidates are used in most British universities and some other

countries. Although the quality of the research is often excellent from the point of view of its economic efficiency, it often does not get applied and used in industry or in public administrative practices. This practice also makes graduate education more expensive, since the graduate students do not have the part-time support, and graduate education is therefore less accessible and less widespread. In some places this separation of research institutes into separate cocoons is carried to logical extremes. In Pakistan, for example, the PSIR labs are well financed for a poor country but are quite inaccessible to easy use by graduate students and faculty in what are often adjacent universities. The research output of these PSIR labs is not user driven, often sits on the shelf, and has a short half-life. The semi-isolation of these institutes is also common in Indonesia, France, the USSR, and other places that are on the European pattern.

This lack of user-driven, peer-group-review research integrated with part-time graduate student support results in an externally inefficient system that is internally so costly that it cannot be maintained except at the cost of inefficient slower economic growth and much more limited access to graduate education.

Instruction of Undergraduates. Graduate student teaching assistants who assist with the instruction of freshmen and sophomores at most universities are in a role that is very similar to that of apprentices or of interns who assist physicians. The practice is not going to change, because it is far less costly. It is sometimes

abused, and has recently been regarded by one critic as a "scam." But consider the alternatives.

The use of full-time faculty who are not engaged in research part-time frequently results in faculty that are out of date (as is common in Pakistan, some of Latin America, and in Indonesia for example) so that graduate students in these places must go abroad. The system for this additional reason is so costly that access must be severely limited. Graduate student instructors in American universities are less experienced, as are interns, but they are in training, supervised by senior faculty, closer to the age of the undergraduates, and able to transmit the new technology being discussed in their graduate seminars to undergraduates much more swiftly.

The practice is sometimes abused. Some graduate teaching assistants, especially in the physical sciences, are unable to communicate well in English. Others do not work out for others reasons. But more departments are developing more organized training sessions for first-time teachers. Even in the absence of this, the less effective teaching assistants are normally weeded out, but only after a semester or a year. The alternative of using fulltime faculty at these beginning levels as is the practice throughout Africa, Asia, and some parts of Europe runs the cost of the instruction of undergraduates up so high that it results in a far smaller proportion of the population able to gain access to higher education than in the U.S.

External Efficiency. The activities of job placement offices located in virtually every college in the highly decentralized U.S.

higher education system are in sharp contrast to the practice in developing countries and some European countries where placement is not viewed as a responsibility of the universities and greater reliance is placed on a centralized manpower planning system. U.S. college placement offices channel students quite effectively to those fields and those industries where the need for their services is greatest. They also send a flow of information backward to students in the pipeline who are well aware of where the opportunities lie and of expected salary levels (see McMahon and Wagner, 1981). Students tend to vote with their feet, gravitating to the fields and the education levels where the returns are highest, as Freeman (1971) found earlier. Admission standards rise in those curricula that are in highest demand as a non-price rationing device, and then the budget money within universities gradually begins to be shifted, but with long lags. It is a highly decentralized system that does respond to local and occupational price signals, albeit sluggishly, and it appears to be reasonably externally efficient in this respect compared to most other countries.

There is a time dimension to the response that needs to be recognized however. For example, at the University of Illinois, 95 percent of the students in Engineering have jobs before they receive their diplomas. Only 54.25 percent of the Liberal Arts students do. But follow-up surveys find that when reinterviewed six months after graduation, 96.47 percent of these Liberal Arts graduates have jobs (see McMahon, 1987, p. 183). Furthermore, the age-earnings profiles of general education graduates tend to be steeper as learning on the job

continues to occur (see McMahon and Geske, 1982, p. 173). Although this does not always apply to teachers and to those social and natural sciences that are dominated by public pay scales, the rates of return to many liberal arts and general education fields often are as high when this time delay in employment, steeper ageearnings profile, and lower educational costs are all taken into account (see McMahon, 1988b).

Financing. In relation to higher education financing patterns throughout Europe, Africa, Asia, and Latin America, parents and students in the United States pay a larger fraction of the total tuition, room, and board costs. The Federal student aid programs although perhaps not adequately targeted on those most in need are nevertheless much more equitably targeted than is the pattern throughout the developing countries and some parts of Europe.

Expansion of higher education in the U.S. to a larger percent of the population therefore is probably made possible not only by internal efficiencies that hold costs down (use of RAs and TAs, lower room and board costs for local community colleges), and by higher family income but also by these financing arrangements that utilize parental contributions where the capacity exists and conserve student aid funds for use where there is need and where enrollment is affected.

It is unfortunate that the lack of efficiencies in the higher education systems in developing countries, such as those discussed, result in relatively high unit costs, and the failure to use adequate methods of appraising financial need also limits the resources

available to finance access and quality. The weakness of the third pillar in the uneasy triangle, efficiency, pulls the props out from under the first two pillars, quality and access.

III. Potentials for Improvement

Although the U.S. higher education system appears to have many basic features that are conducive to its internal and external efficiency that make it quite competitive and a major foreign exchange earner, there is always room for improvement. A few sources of internal inefficiency can be mentioned that merit further investigation.

1. There is an increase in the amount of time it takes to complete a bachelor's degree. In a recent study sponsored by NCES (1988) of high school graduates in 1980, it is found that full-time students entering college directly after high school are taking 4.5 years on the average to complete a 4.0 year bachelor's degree now. There are also many more part-time students, so if they are included, this trend is even more dramatic. The average load per year of "full-time students" (those with 12 semester hours per semester and up) also appears to be falling; this is certainly true if part-time students are included in the average.

There are some hypotheses about the cause of this that merit further investigation, for it surely is a source of internal inefficiency. In some developing countries and in France where students are much more highly subsidized than in the U.S. there is less incentive to finish expeditiously. It is not much comfort to us that it takes

6½ years to finish a 4 year bachelor's degree in Indonesia, 6 years in Nepal, and about that long in Malawi. Efforts to limit the large subsidies going to the sons and daughters of the highest income families and to reform the system in other ways led to major student protests in France and in Nepal recently, protests that also found support among influential parents.

In the U.S. parents and students pay a larger percent of the cost and the problem is not as severe. But since the late 60s drop rules in the U.S. became very lax at many universities, which encourages course shopping at the beginning of each semester. This operates to keep the average course load down, closer to the minimum of 12 semester hours each semester, and also to encourage dropping back to part-time enrollment to get tuition refunds. This has the effect of keeping opening fall enrollments up. But it would appear to be a source of growing internal inefficiency.

2. A second problem is related sources of excess capacity on campuses that run up costs unnecessarily. For example, the number of students in class before Thanksgiving or Spring break, and the number of regularly scheduled classes that actually operate before vacations have all fallen dramatically in sharp contrast to when there used to be double cut rules. Very few faculty take attendance anymore (and those that do probably do so at their own peril on the CEQs). Although Saturday morning and evening classes were common until the late 1960s, now the average class attendance of undergraduates on Fridays is very low.

This absenteeism is likely to be a serious source of internal inefficiency since education and learning research repeatedly shows that student achievement (after controlling for other things) is heavily influenced by the student's time-on-task. (See, for example, the survey by Bruce Fuller, 1987, pp. 283-5). It is also evident that these and related practices generate excess capacity. Many courses are closed at registration time in popular or in mainline curricula because of capacity constraints, with many students turned away. Yet the course shopping that is permitted results in classrooms that are perhaps only two-thirds full later, and the lack of use of courses by students before vacations and on Fridays reduces utilization further. The resulting excess capacity both in underutilized classroom space and underutilized faculty time perhaps raises the cost of higher education one-third over what it would otherwise be.

3. A third source of internal inefficiency are the number of courses allowed to go forward with very few students. This is not indefinitely, to be sure. But for one or two semesters, and usually at the Masters or Ph.D. level, there are many courses with one or two or three students that are counted as part of faculty teaching loads rather than being dropped on the first day of each semester and re-offered later. This practice is always defended on some basis. But, it is very costly.

4. Fourth, there is normally reluctance to make a serious commitment to doing cost effectiveness analysis in university budget offices. It is necessary to seek out sources of internal and external inefficiency, and this takes study.

For example, the cost effectiveness of some degree programs is very low--often because of a very small output and lack of a critical mass. Others, including some that on the surface might be though to be very costly, are very cost effective. In Britain the University Grants Commission has established uniform cost accounting categories among institutions that has made it possible to see this pattern clearly across institutions much more clearly (see Donald Verry, 1976). Although comparisons across institutions are more difficult in the U.S., there are some possibilities (e.g., the unique statewide Illinois Unit Cost Study). Within institutions, a Ph.D. dissertation by James Dyal (1975) found that among 72 academic departments, the benefit/cost ratios at the Ph.D. level were highest in the Chemistry and Chemical Sciences departments. They were much lower in some fields in Agriculture for example where the output was only one or two Ph.D.s a year or in Veterinary Medicine where the output was small. A later study by McMahon (1979) included the research output of each department, as well as a weighted measure of undergraduate and graduate instructional units, and a similar pattern emerged. Some of the departments or colleges that might appear on the surface to be the highest cost, such as the College of Law and the Chemistry Department turned out however to be the most cost effective. The humanities, Psychology, Economics, History, Math, Library Sciences, and Business Administration were all cost effective compared to the all-campus average. Engineering, Physical Sciences, and Life Sciences were at the all-campus average, and the smaller and/or more costly programs in the Medical Sciences, Veterinary Medicine, Labor and Industrial

Relations, and Dairy Science were far less cost effective. The Aviation program was so cost ineffective that compared to the all-campus average it was off the map, but something has since been done about that. The Chemistry Department, incidentally, which has a large output of Ph.D.s every year and makes very extensive use of teaching assistants in the beginning courses has one of the lowest costs per instructional unit of any college level department in the state.

The basic point is that what is or what is not cost effective is not always apparent on the surface. To improve cost effectiveness requires a continuing search, and in large organizations, a commitment to do the necessary analyses before making decisions.

5. Allocative Efficiency Between Public and Private Institutions. The State Student Incentive Grant Program (SSIG) provides the Federal government with a policy lever to correct the allocation between public and private institutions whenever the need to do so exists. The fact that Federal grants to state scholarship funds has not been used extensively may only mean that the survival of large numbers of private colleges has not been in serious jeopardy, and not that this tool is useless and should be abolished.

State scholarships in many states cover only tuition, and not also room and board as do the Pell Grants. This is not true in all states. Nevertheless, since the tuition at private institutions is considerably higher, and since these state scholarship grants give more students the freedom to choose private institutions, a larger percentage of these funds wind up as aid to private colleges and universities. Perhaps the reason that SSIGs have not been used more

extensively to correct the allocation is the rule of thumb "If it isn't broken, don't fix it." But the author does not believe in destroying centers of excellence. If the survival of good quality private colleges should every be in jeopardy, it would be desirable to keep SSIG's available for more extensive use.

IV. Conclusions

The evidence cited suggests that higher education in the United States measures up pretty well on grounds of economic efficiency. One cannot say the same for U.S. secondary education, or for the top-heavy higher education systems in some other countries. But the evidence is that the real social rate of return to investment in higher education remains reasonably high at 11 percent, which is high in relation to the return on housing or the real rate of return on bonds. It is also reasonably stable and therefore less risky. Although there was a temporary dip from 1973 through 1982, the returns have recovered and there is therefore no evidence of a secular decline. Furthermore, the public encouragement to families to invest in education induces private saving, and therefore probably increases the nation's total saving and total investment rates when these are defined to include human capital accumulation.

There are several major sources of internal efficiency that help to make the U.S. higher education system efficient and internationally quite competitive that are discussed above. They include emphasis on university-based user-driven research, the economically efficient use of part-time graduate student intern teachers, externally efficient

decentralized placement, the sharing of financing with those parents that have the ability to pay, and faculty who are not full-time teachers but who are also involved with the development of the new technology. International students flock to U.S. higher education; it is a major foreign exchange earner, and the undergraduate enrollment ratios as a percent of each age group are the highest in the world.

Nevertheless, the time it takes to finish a four year bachelor's degree is increasing, the average semester-hour load of students is falling, the internal excess capacity and the unit costs are rising, the high cost low output curricula that have not reached a critical mass are plentiful, and administrative leaders are not very well informed or concerned about the internal sources of cost-ineffectiveness.

All of us are concerned by the long run secular slowdown in productivity and per capita economic growth in the United States. The higher educational system with its capacities for high quality basic research, for the transmission of the results to industry and to the next generation, and for high quality instruction, all within a relatively efficient and equitable structure, is a major asset. The more higher education chooses to get its house in order, and improve further its internal and external efficiency, the more it puts itself in a position to benefit, and the more it puts itself in a position to help the nation.

References

Bartel, Ann and Frank Lichtenberg (1985), "The Comparative Advantage of Educated Workers in Implementing the New Technology: Some Empirical Evidence," Working Paper 1718, NY: National Bureau of Economic Research, 31 pp.

Cohn, Elchanan (1988), "College Education's Value," Wall Street Journal, October 20, 1988, New York.

Cohn, Elchanan and Woodrow Hughes (1988), "Social Internal Rates of Return to College Education in the U.S., 1969, 1974, 1978, and 1982," University of South Carolina.

Data Resources Inc. (1988), "Review of the U.S. Economy," October 1988, Data Resources Inc., Lexington, Massachusetts.

Denison, Edward F. (1984), "Accounting for Slower Economic Growth: An Update," in J. Kendrick (ed.), International Comparisons of Productivity and Causes of the Slowdown, Cambridge, MA: Ballinger.

Dyal, James (1975), Investment in Graduate Education, Ph.D. Dissertation, University of Illinois, Urbana.

Eisner, Robert and D. Nebhut (1982), "An Extended Measure of Government Product: Preliminary Results for the United States, 1946-76."

Frances, C. (1986), "Major Trends Shaping the Outlook for Higher Education," AAHE Bulletin, December 1985, p. 5.

Freeman, Richard (1971), The Market for College-Trained Manpower, Cambridge, Harvard University Press.

Freeman, Richard (1976), The Overeducated American, Academic Press, New York and London.

Fuller, Bruce (1987), "What School Factors Raise Achievement in the Third World?", Review of Educational Research, Vol. 57, No. 3, 255-292.

Hauptman, Arthur M. (1988), "The Federal and State Financial Commitment to Higher Education in the Face of Federal Budget Deficits," Public Policy Program, College of William and Mary, Williamsburg, Virginia, October 1988.

Hartle, Terry (1988), "Federal Support and Budgetary Efficiency," Public Policy Program, College of William and Mary, Williamsburg, Virginia, October 1988.

McMahon, Walter W. (1976), "Influences on Investment by Blacks in Higher Education," American Economic Review, 66, 2, pp. 320-24.

McMahon, Walter W. et al. (1979), "Internal Budget Reallocations and Educational Policy," Report of the Senate Committee on the Budget, BG.80.2, Senate Office, Urbana, December 10, 1979.

McMahon, Walter W. and Alan Wagner (1981), "Expected Returns to Investment in Higher Education," Journal of Human Resources, Vol. XVI, No. 2, pp. 274-85.

McMahon, Walter W. (1983), "Why Families Invest in Higher Education," in The Collection and Analysis of Economic and Consumer Behavior Data, Seymour Sudman (ed.), University of Illinois Press, Urbana.

McMahon, Walter W. (1984), "The Relation of Education and R&D to Productivity Growth" (in OECD Nations), Economics of Education Review, Vol. 3, No. 4, pp. 299-314.

McMahon, Walter W. (1987), "Student Labor Market Expectations," in George Psacharopoulos (ed.), Economics of Education: Research and Studies, Pergamon Press, Oxford, pp. 182-7.

McMahon, Walter W. (1987), "The Relation of Education and R&D to Productivity Growth in the Developing Countries of Africa," Economics of Education Review, Vol. 6, No. 2, pp. 183-194.

McMahon, Walter W. (1988a), "Potential Resource Recovery in Higher Education in the Developing Countries and the Parents' Expected Contribution," Economies of Education Review, Vol. 7, No. 1, pp. 135-52.

McMahon, Walter W. (1988b), "The Economics of Vocational and Technical Education: Do the Benefits Outweigh the Costs?" International Review of Education, UNESCO, Vol. 34, No. 2, pp. 173-94.

McMahon, Walter W. and Terry Geske (1982), Financing Education: Overcoming Inefficiency and Inequity, University of Illinois, Urbana, New York, and London.

Mills, Ed (1988), "Social Returns to Housing and Fixed Capital," Working Paper, Department of Economics, Northwestern University, Evanston, Illinois.

National Center for Educational Statistics (1988), NCES-Sponsored study of high school graduates in 1980, Dr. Sam Peng, NCES (202-357-6354), Washington, D.C.

Psacharopoulos, George and Maureen Woodhall (1985), Education and Development, Oxford University Press, Oxford.

Verry, Donald and B. Davis, (1976), University Costs and Ouptuts.
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